

Econometrics - Advanced Methods

GMM and CUE

A. Consider the following model

$$y = X\beta + u$$
$$X = Z\pi + v.$$

1. Use “EAM2019 - class 4A.do” and have a look at the structure of the numerical optimizer in Mata (see also the Description part in “help mata_optimize”).
2. Adapt the part within

```
: void myols(todo,b,crit,g,H) {  
>     external y,X  
>     W=invsym(X'X)  
>     m=X'(y:-X*b')  
>     crit=m'W*m  
> }
```

such that the minimization gives you the 2SLS estimator. (Hint: The first line has to be `external y,X,Z` then Mata knows we are going to use the matrix Z , too).

3. Now, move on to “EAM2019 - class 4B.do” and fill in the missing W in the two-step GMM optimization. At the end of the do-file I also ask you to define the overidentification test for two-step GMM.
4. So far, we actually don't need to optimize any criterion function directly because we know there is a proper closed-form solution. Now, open “EAM2019 - class 4C.do”. It's about the CUE, which has no closed form solution. Define W in this do-file.